Instructions for the Analog Input Module used with IMPACC Series III Networks

THE ANALOG INPUT MODULE

The Analog Input Module (AIM) is a microprocessor-based analog input data acquisition device designed for use with IMPACC Series III networks. Its intended use is to record energy consumption and other parameters by monitoring signals from primary measurement devices such as electric, gas and water utility meters, BTU and steam flow meters, temperature and pressure sensors, equipment runtime and any other devices having the following signal types:

- General purpose current loops, 0-20 mA
- Pulse contacts up to 10 Hz
- Runtime contacts

A variety of values are computed and stored depending on the sensor type. Refer to the IMPACC Series III software manual.

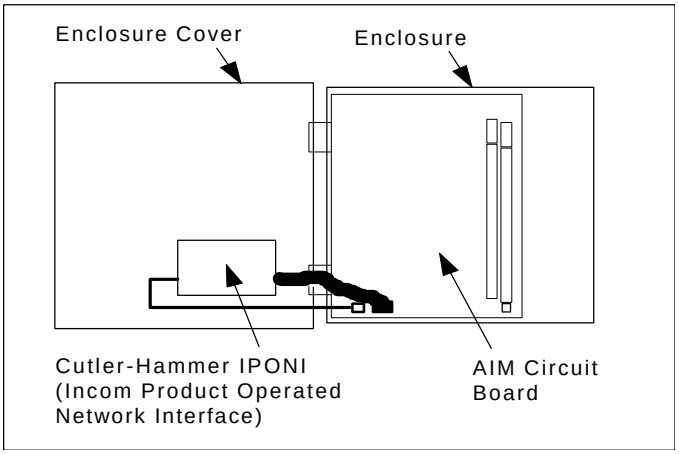


Figure 1 The Cutler-Hammer Analog Input Module

INSTALLATION

The AIM is designed to be installed, operated and maintained by adequately trained people. Failure to follow all guidelines, recommendations and instructions may cause equipment damage and/or personal injury. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, check-out, safe operation or maintenance. The installation must be in compliance with the National Electric and all local codes or regulations, as well as safety practices, for this class of equipment.

Only low voltage signals and 24VAC power are allowed to enter the AIM enclosure. The AIM is designed to accept sensor inputs of +/-10 volts or less. Any high voltage terminations must be made outside of the AIM enclosure in an electrical panel or junction box.

1) Parts List. Open the AIM shipping container and remove all materials. Identify the items and quantities listed below before continuing with the installation

1 - 10”x10”x4” NEMA 1 enclosure
1 - AIM Circuit Board
6 - 1/4” Hex Stand-off Screws
6 - 1/4” Nylon Screws
1 - Plastic Cover Plate
1 - 120 VAC/24VAC 24VA Plug-In Transformer
1 - 1.5A 250V Fuse (spare)
2 - Length of #12 AWG THHN Grounding Wire
4 - Crimp Eyelet
2 - 1/4” Screw with Nut
1 - IPONI module
1 - Phoenix Connector with Pre-wired Cable

2) Choosing a Location. The NEMA 1 enclosure is designed for indoor installation only. The typical location is on a wall in an electrical closet or mechanical room. Ambient conditions must be between 32 and 125 Deg. F and 20% to 80% RH, non-condensing. The AIM must not be mounted inside electrical housings such as motor control centers and switchgear.

Either locate the enclosure within 5 feet of a standard 120VAC receptacle, or install a receptacle within five feet of the mounting location.

3) Securing the Enclosure. There are four holes through the rear surface of the enclosure to allow wall mounting. If mounting to a plywood surface, four #10 1” wood screws are recommended. Use suitable hardware for other surfaces to secure the enclosure.

The sides of the enclosure are lined with knockouts of various sizes to facilitate conduit installation. Since all terminations are made to the right edge of the circuit board, the only usable knockouts are on the right side and extreme right of the top and bottom. If further holes are needed, remove the AIM circuit board before drilling to prevent damage to the electrical components. All wires and cable entering the AIM enclosure must have proper strain relief and chafing protection.

4) Securing the AIM Circuit Board. Clear all debris from the enclosure. Locate the hex stand offs riveted to the inside of the enclosure. Line up the holes on the stand offs with the holes in the AIM circuit board. Secure the circuit board to the stand offs with the hex stand off screws.

5) Grounding the Enclosure and Circuit Board. Grounding is essential for proper operation and protection of the AIM and safety of the user. Refer to Figure 2 below for grounding connections.

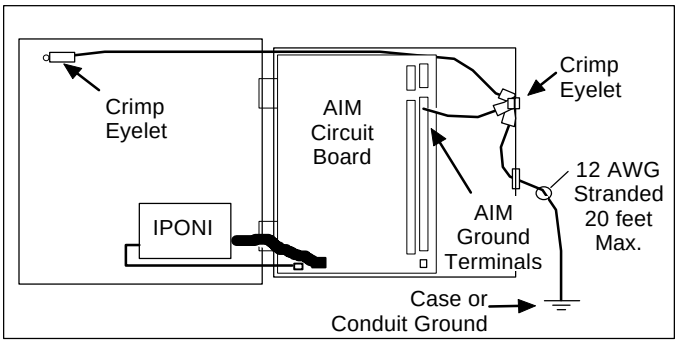


Figure 2 Grounding Connections

Locate the hole drilled into the enclosure cover. Attach a crimp eyelet on the inside of the cover using the 1/4" screw and nut. Connect one of the grounding wires to the crimp eyelet and crimp tight. Locate the hole drilled on the upper right-hand wall inside the enclosure. Attach the remaining crimp eyelets on the interior side of the wall using a 1/4" screw and nut. Connect the grounding wire attached to the enclosure door to one of the crimp eyelets on the inside wall. Connect a grounding wire from a free crimp eyelet on the inside wall to an available ground terminal (terminals 41-72). Attach the remaining crimp eyelet of the inside wall to a suitable ground source, such as case ground for electrical enclosures and conduit.

6) Wiring Connections and Features. Figure 3 shows the wiring connections (other than grounding connections) and major features of the AIM. Wiring connections include 24VAC power, channel input terminals 1-32, channel ground terminals 41-72, auxiliary terminals and communication connections. Channel grounds are electrically common (non-isolated). Auxiliary terminals are as indicated below:

+ 8 VDC	40	80	+ 8 VDC
+ 8 VDC	39	79	+ 8 VDC
+ 8 VDC	38	78	+ 8 VDC
+ 24 VDC	37	77	+ 24 VDC
+ 24 VDC	36	76	+ 24 VDC
+ 24 VDC	35	75	+ 24 VDC
Contact 1A	34	74	Contact 1B
Contact 2A	33	73	Contact 2B

Other features include a 1.5A 250V fuse (5mm x 20mm), LED indicators and system test pushbutton.

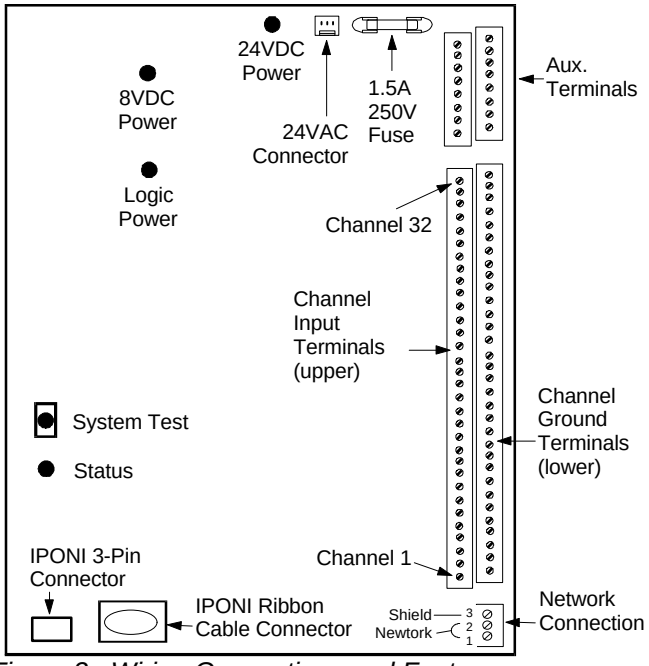


Figure 3 Wiring Connections and Features

7) Communication Connections. Power must be disconnected from the AIM before making communication connections. Failure to disconnect power may result in electrical shock and/or damage to the AIM and IPONI.

As shown in Figure 4 there are two connections from the IPONI to the AIM, and a network connection to the AIM. Plug the 3-terminal Phoenix connector with pre-wired cable into the IPONI and plug the other end of the cable into the 3-pin connector at the bottom left corner of the AIM. Plug the DB9 ribbon cable connector into the AIM. Connect the network communication wires to the network connector at the bottom right corner of the AIM as shown. The shield is "floating", or not grounded at the AIM.

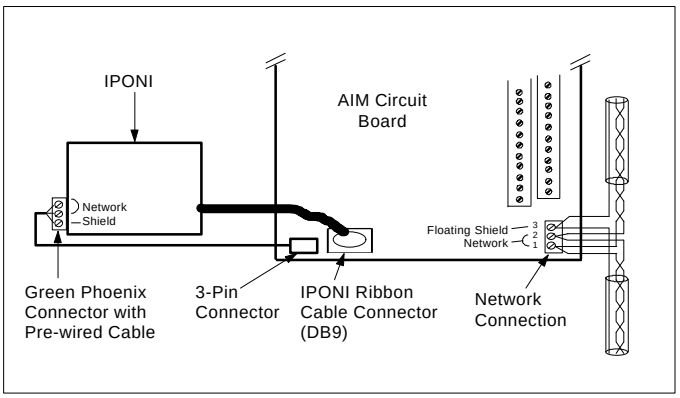


Figure 4 Communication Connections

8) Securing the Cover Plate. Before securing the cover plate, check grounding and communication connections.

Adjust the two cables from the IPONI so that they fit under the cover plate. Line up the holes in the top of the stand off screws used to secure the circuit board with the holes in the plastic cover plate. Use the 1/4" nylon screws to secure the cover plate. Do not overtighten.

9) Connecting Power. The AIM is powered by a UL-listed, 24VAC, class 2, plug-in transformer rated at 24VA. Plug the transformer into any standard 120VAC wall outlet. Attach the transformer connector to the 24VAC connector on the AIM to the left of the fuse brackets on the upper right corner of the circuit board. Note that the connector is keyed to fit in only one direction.

Once power has been applied, the LEDs indicating 'Logic Power', '8VDC Power' and '24VDC Power' should illuminate. Under normal operation the 'Status' LED will flash about once a second. If a malfunction has occurred, the 'Status' LED will remain lit. If the LEDs do not illuminate in this fashion, refer to Step 12.

10) Connecting Sensors. Disconnect power from the AIM before installing any sensor wiring. Failure to disconnect power may result in electrical shock and/or damage to the AIM.

The maximum allowable voltage to any channel input is 10 Volts. 24VDC power is available to power 4-20 mA current loops. 8VDC power is available to monitor pulse or runtime contacts. Refer to the specific sensor type below for wiring diagrams.

Cable shields may be terminated at the AIM channel ground terminals or at the sensor. In either case, shields must be terminated at only one end.

4-20 mA Current Loop Sensors

Figure 5 shows wiring connections for general purpose, 0-20 mA or 4-20 mA current loops. Sensors with this signal output can be purchased from many manufacturers to measure virtually any parameter, including temperature, humidity, pressure and flow. The AIM is equipped with a set of voltage source terminals that provide 24VDC loop power, or these sensors can be powered by an external source as shown in Figure 3. In all cases, current loops must be grounded at the AIM.

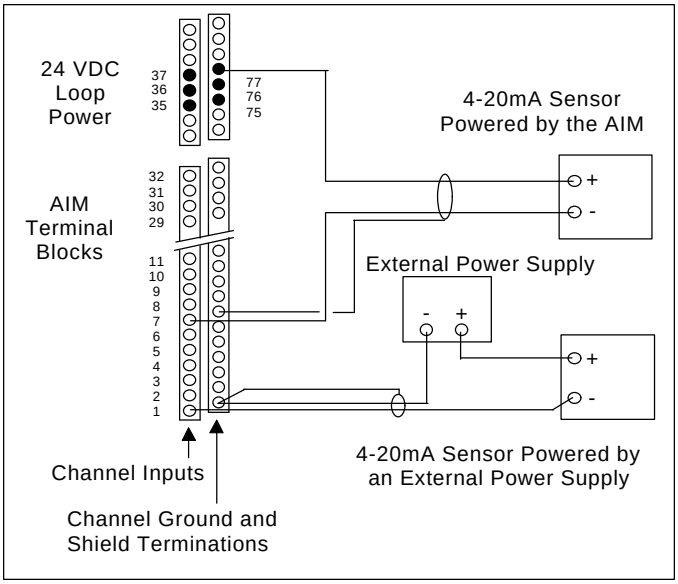


Figure 5 General Purpose Sensor Wiring

Pulse and Runtime Contact Sensors

Figure 6 shows the typical installation for pulse and runtime contact sensors. Dry or isolated contacts must be powered by a voltage source. Two voltages are available at the AIM auxiliary terminals, 8VDC and 24VDC. If the 8VDC power is used, no resistor is required. If the 24VDC power is used, install a 1,000 Ohm resistor in series with the dry contact to drop the voltage down below 10 Volts.

Notes:
1) Input impedance is 499 ohms.
2) Pulse rates cannot exceed 10 pulses per second, or 10Hz
3) Runtime contacts may be either normally open or normally closed. The IMPACC Series III software must be configured accordingly.

There is enough power on the auxiliary terminals to drive all 32 inputs using the method shown in Figure 6. If the 24VDC loop power is used, the total maximum power draw off of the 8VDC and 24VDC power terminals combined cannot exceed 16VA.

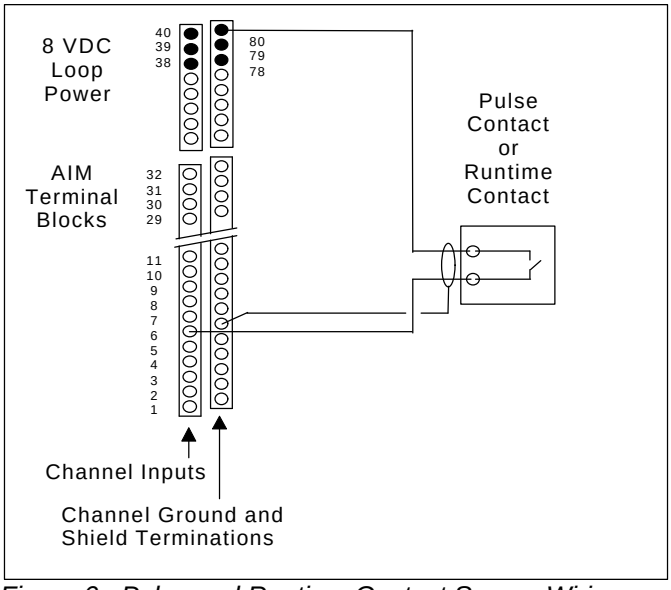


Figure 6 Pulse and Runtime Contact Sensor Wiring

11) Cable Recommendations. Note that these are only recommendations. For some situations only a certain type of cable may be used. before selecting specific cables, consult local and National Electric codes.

Analog sensors should use a 22 AWG twisted-pair (stranded conductor), foil shielded cable with a drain wire. Multiple sensors can be connected through a multi-pair cable. Consult the sensor's manufacturer for limits on cable lengths. Generally 500 feet is acceptable.

Contact closure and runtime sensors should use a 22 AWG twisted-pair (stranded conductor), foil shielded cable with a drain wire. Multiple sensors can be connected through a multi-pair cable. Cable runs in general should not exceed 1000 feet.

12) Trouble Shooting. Under normal operating conditions the LEDs indicating 'Logic Power', '8VDC Power' and '24VDC Power' will remain lit. The 'Status' LED will flash about once a second. If a malfunction has occurred, the 'Status' LED will either remain lit or remain un-lit. This typically indicates a sensor profile error, or in rare cases, a clock or memory error. If the Status LED is not flashing normally, perform the following steps in the order given below until it begins flashing normally.

A) Attempt communication using IMPACC. If communication is possible, download the sensor profile and reset the date and time.

B) Disconnect power from the AIM for 5 seconds and then re-connect. Proceed to step A.

C) Disconnect power from the AIM. Hold down the 'System Test' pushbutton as power is re-connected. This clears the memory of the AIM. Disconnect power again from the AIM, wait 5 seconds and then re-connect without holding down the pushbutton. Proceed to step A.

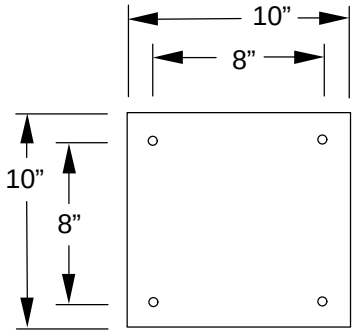
If none of these steps corrects the problem, please call the Advanced Products Support Center at the number below.

SPECIFICATIONS

32 input channels, non-isolated, ±10 Volts maximum
499 Ohm input impedance
Capacitor backed-up RAM

Current input	0-20 mA DC accuracy ±0.02 ma from 0.2 to 20 mA (excludes sensor error) resolution 0.01 mA
Pulse input	Form "A" contact closure 10 Hz maximum, 50% duty cycle 10ms de-bounce
Runtime input	Form "A" contact closure
Power Supply	120VAC/24VAC UL listed transformer 24VA
Power Consumption	8VA including IPONI
Auxiliary Power	8VDC and 24VDC 16VA total, maximum
Operating Environment	32-125°F (0-50°C) 20-80% RH non-condensing
Enclosure	NEMA 1 12"H x 10"W x 6"D

Mounting Holes:



Catalog No. AIM
Style No. 4D13140G01

For product support please call the Advanced Products Support Center:
1-800-809-2772 or 412-494-3750